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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/976,241	10/11/2001	Mariagiovanna Sami	851763.411	9714

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EXAMINER

COLEMAN, ERIC

ART UNIT	PAPER NUMBER
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2183

DATE MAILED: 06/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary	Application No.	Applicant(s)	
	09/976,241	SAMI ET AL.	
	Examiner	Art Unit	
	Eric Coleman	2183	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1,3,6-15,17,19 and 26 is/are rejected.
- 7) ☐ Claim(s) 2,4,5,16,18 and 20-25 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some c) ☒ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Claim Rejections - 35 USC § 112

Claims 11,12,13,19 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. The claims include "write-back is envisaged"—claim 12, (lines 12-13) and "envisaged write-back"—claim 11, line 3, and claim 13, (line 3); and "disabling of any interrupt is envisaged"—claim 19, (lines 1-2). This "envisaged" claim language is not clear because it is uncertain whether a thought or an operation or something else is being claimed.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1,3,6-10,14,15,17,26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Carnevale (European patent Application 0569312 A2)(submitted by applicant) in view of Sproch (US patent No. 6,247,134) and Lozano (Article in IEEE Proceedings of MICRO-28 dated 1995 entitled Exploiting Short-Lived Variables in Superscalar Processors).

Carnevale taught the invention substantially as claimed including a data processor ("DP") system comprising a pipelined processor (e.g., see fig. 3) comprising a

Art Unit: 2183

plurality of stages (60,80,82,84,85,88) (e.g., see fig. 3); forwarding network of forwarding paths which connect the stages (e.g., see figs. 3,4 and col. 5, line 20-col. 8 line 47). Carnevale taught an exit stage for the pipeline but did not specify the data destination for the data after leaving the pipeline (e.g., see col. 5, line 20-42).

However storing of the data into a memory would have required in order to prevent the loss of the data. One of ordinary skill would have been motivated to use registers to implement the memory to allow quick access to the data in further processing.

Carnevale did not specify (claim 1,26) an optimization of power consumption function. Sproch however taught saving power in a pipeline using selective gating of data to registers (e.g., see figs. 5,6,7,8,9 and col. 3, line 56-col. 5, line 31). Sproch did not specify (claims 1,26) that the selective data to register was performed because of reduced liveness lengths of the operands. However, Lozano taught analysis to identify short-lived variables (e.g, see p. 292, col. 2. Lozano taught the committing of instructions with short life range to the register file would be useless because none of the values would ever be obtained from the register file (e.g., see p. 293, col. 2-p. 296. col. 1).

It would have been obvious to one of ordinary skill to combine the teachings of Carnavale and Sproch and Lozano. One of ordinary skill would have been motivated ton incorporate the teaching of selective gating of data in as taught by Sproch into the Carnavale system to allow the system to save power. Also one of ordinary skill would have been motivated to incorporate the teachings of Lozano of analysis of the data for determining which data to write to registers as this would have provide a more efficient

system as the gating to registers would have been optimized and consequently the power conservation would have been optimized.

As per claim 3, Sproch taught logic dedicated to disabling writeback (e.g., see fig. 1A, 35, 6, 7, 8, 9 col. 9, lines 7-56). As per claim 6, Lozano taught the implementation in a superscalar processor (e.g., see p. 293, col. 1). Also since Lozano taught (claim 7) compile time analysis one of ordinary skill would have been motivated to configure the system as a VLIW (e.g., see p. 292, col. 2). Further as to claims 8,9 Lozano taught the compiler analysis of live ranges of variable was provided to the architecture through the instruction set (e.g., see p. 295) Here, the instruction set comprised instruction code and one of ordinary skill would have been motivated to use unused operation codes in order to not reduce the functionality of the system.

As per claim 10,14,15 Sproch taught registers between stages (e.g., see fig. 3) and selective discarding of results by disabling write-back (e.g., see col. 9, lines 7-56). In order for the compiler implementation as taught by Lozano it would have been required for the compiler to have access to the registers in the forwarding path in order to control the write-back. As per claim 17, it was well known in the art at the time of the claimed invention that upon an exception the pipeline is characteristically flushed.

Allowable Subject Matter

Claims 2,4,5,16,18,20-25 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

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The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Peng (US. Patent No. 6,663,971) disclosed a mechanism for forward data in a processor pipeline (e.g., see abstract).

Johnson (US Patent No. 5,784,320) disclosed a system for reducing power consumption in a memory by employing a conditional write controller (e.g., see abstract).

Hinton (US Patent No. 5,809,325) disclosed a system for scheduling instructions by predicting future availability of resources (e.g., see abstract).

Favor (US Patent No. 5,799,165) disclosed out-of-order processing that removes an issued operation from an execution pipeline upon determining that the operation would cause a lengthy pipeline delay (e.g., see abstract).

Tanaka (US Patent No. 6,738,966) disclosed a compiling device, computer-readable recording medium on which a compiling program is recorded (e.g., see abstract).


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Eric Coleman whose telephone number is (703) 305-9674. The examiner can normally be reached on Monday-Thursday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Chan can be reached on (703) 305-9712. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

EC

June 21, 2004



ERIC COLEMAN
PRIMARY EXAMINER

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